

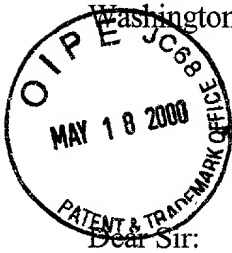
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May 18, 2000

BOX PCT

Assistant Commissioner for Patents
Washington, D.C. 20231

PCT/JP98/04385
-filed September 29, 1998



Re: Application of Shigeki ASAI
MOTOR SUPPORTING DEVICE
Our Ref: Q59136

Dear Sir:

The following documents and fees are submitted herewith in connection with the above application for the purpose of entering the National stage under 35 U.S.C. § 371 and in accordance with Chapter I of the Patent Cooperation Treaty:

- ☒ an executed Declaration and Power of Attorney.
- ☒ an English translation of the International Application.
- ☒ 5 sheets of formal drawing (Figures 1-9).
- ☐ an English translation of Article 19 claim amendments.
- ☐ an English translation of Article 34 amendments (annexes to the IPER).
- ☒ an executed Assignment and PTO 1595 form.
- ☒ a Form PTO-1449 listing the ISR references, and a complete copy of each reference.
- ☐ a Preliminary Amendment

It is assumed that copies of the International Application, the International Search Report, the International Preliminary Examination Report, and any Articles 19 and 34 amendments as required by § 371(c) will be supplied directly by the International Bureau, but if further copies are needed, the undersigned can easily provide them upon request.

The Government filing fee is calculated as follows:

Total claims	4	-	20	=		x	\$18.00	=	\$0.00
Independent claims	1	-	3	=		x	\$78.00	=	\$0.00
Base Fee									\$840.00

TOTAL FILING FEE	\$840.00
Recordation of Assignment	\$ 40.00
TOTAL FEE	\$880.00

09/554670

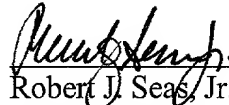
SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC

422 Rec'd PCT/PTO 18 MAY 2000

Checks for the statutory filing fee of \$840.00 and Assignment recordation fee of \$40.00 are attached. You are also directed and authorized to charge or credit any difference or overpayment to said Account. The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§ 1.16, 1.17 and 1.492 which may be required during the entire pendency of the application to Deposit Account No. 19-4880. A duplicate copy of this transmittal letter is attached.

There is no claim to priority.

Respectfully submitted,



Robert J. Seas, Jr.
Registration No. 21,092

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Date: May 18, 2000

5/PART

09/554670

1 422 Rec'd PCT/PTO 1 8 MAY 2000

TITLE

Motor Supporting Device

BACKGROUND OF THE INVENTION

5 Technical Field

The present invention relates to a motor supporting device accommodating a motor and a driving gear for use in a disk player system, which is capable of reducing the noise produced by the gear with a relatively simple construction.

10

Background Art

Conventionally, a motor for use in a disk player system is, in many cases, accommodated in a motor base and fixed to a chassis or the like by a fixing screw. Further, a so-called gearbox provided
15 with a gear for transmitting the driving force of the motor is disposed in the nearby area of the motor base.

It should be noted that although a low-noise stability is required for a disk player system in its operating mode, when the motor is driven, its drive shaft and support shaft are vibrated to
20 make substantial noise. For this reason, various efforts have been made so far to suppress the noise, such as providing a cover for covering the motor base, applying a predetermined pressure to those drive shaft and support shaft and so forth.

On the other hand, a motor supporting device composed by
25 integrally forming the motor base and the gear box has been provided so far, so as to reduce the number of components and also minimize the size and weight of the entire device. The motor supporting device applied to a pickup driving mechanism in a disk player system will now be explained as shown below.

Fig. 10 denotes a plain view of an exemplary case in which a conventional motor supporting device is applied to a pickup driving mechanism. In the figure, reference numeral 31 denotes a base, 32 denotes a spindle motor for rotating an optical disk (not shown),

5 33 denotes a pickup, 34 denotes a pickup driving mechanism for positioning the pickup 33, and is driven by a driving force transmitted from a gear 38 later-explained. Further, reference numeral 35 denotes a sled motor that functions as a driving source of the pickup driving mechanism 34, whose drive shaft is provided

10 with a gear (not shown). Reference numeral 36 denotes a motor base for sustaining the sled motor 35, and is provided with a gear 37 in a rotatable manner. The motor base 36 sustains the sled motor 35, exposing though the most parts of the external surface of the sled motor. Reference numeral 38 denotes a gear for transmitting the

15 driving force fed from the gear 37 to the pickup driving mechanism 34, numeral 39 denotes a pressing member for pushing a support shaft of the gear 38, and is fixed to the motor base 36, and numeral 40 denotes a fixing screw for fixing the motor base 36 to the base 31.

The operation of the conventional motor supporting device is

20 as follows.

When the sled motor 35 is activated, the driving force thereof is transmitted from a gear provided to the drive shaft thereof, sequentially to the gear 37, the gear 38 and to the pickup driving mechanism 34, so as to finally activate the pickup 33. During this

25 driving force transmitting operation, the drive shaft of the sled motor 35 and the support shaft of the gear 37 are vibrated to make a noise.

Since the conventional motor supporting device is constructed as explained above, in order to suppress such noise, further

components such as a covering member for the motor base 36 and a pressing member for applying a predetermined pressure to the drive shaft of the sled motor 35 or to the support shaft of the gear 37 have to be additionally provided, and due to this, a problem arises
5 that the total cost will be raised due to the increase in the number of components and also due to inefficiency in its assembling operation.

The present invention has been proposed to solve the problems aforementioned, and it is an object of the present invention to
10 provide a motor supporting device which is capable of reducing the total number of components for improving its assembling operation, and also capable of suppressing the noise of a gear used therein.

DISCLOSURE OF THE INVENTION

15 In order to achieve the above object, the motor supporting device according to the present invention is constructed in such a manner as to comprise a motor accommodating section for accommodating and holding a motor therein, and a gear holding section that rotatably holds a gear for externally transmitting a driving force of the motor,
20 wherein the motor supporting device further comprises a covering section, which is integrally formed with the motor accommodating section and flatly covers the gear holding section.

Due to this construction, such a good effect as reducing the noise produced by the gear can be obtained with a relatively simple
25 structure.

In the motor supporting device as explained above, the covering section is bendably formed with respect to the motor accommodating section, and comprises a side-pressing section that abuts to the end portion of the gear provided to the motor drive shaft.

Due to this construction, the number of components can be reduced, and the noise produced by the gear mounted to the motor drive shaft can also be lowered.

The motor supporting device according to the present invention
5 further comprises a fitting section for fixing the covering section to the motor accommodating section, with the side-pressing section being abutted to the end portion of the gear mounted to the motor drive shaft, which fitting section being provided to at least either one of the covering section and the motor accommodating section.

10 Due to this construction, not only the number of components is reduced, but also the covering section can be readily fixed to the motor accommodating section, so that the noise of the gear mounted to the motor drive shaft can be greatly lowered.

The motor supporting device according to the present invention
15 further comprises a fitting section for coupling the end portion of a support shaft that is formed in the gear holding section for rotatably holding the gear to the covering section, which fitting section being provided to at least either one of the covering section and the end portion of the support shaft.

20 Due to this construction, not only the number of components is reduced, but the covering section can also be readily coupled to the end portion of the supporting shaft, so that the noise of the gear of the gear holding section can be greatly lowered.

25

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a plain view of the motor supporting device according to a first embodiment of the present invention.

Fig. 2 is a side view of the motor supporting device.

Fig. 3 is a perspective view of a locking piece and a locking

claw for use in a cover-fixing operation.

Fig. 4 is a perspective view of a locking piece and a locking claw for use in a case-fixing operation.

Fig. 5 is a sectional view corresponding to the sectional surface cut along the line A - A of Fig. 1, in a state that the motor base is in use.

Fig. 6 is a front view in a state that the motor base is in use.

Fig. 7 is a sectional view corresponding to the sectional surface cut along the line B - B of Fig. 1, in a state that the motor base is in use.

Fig. 8 is a plain view of an exemplary case in which the motor base is applied to a pickup driving mechanism.

Fig. 9 is an illustration showing the back surface of the case of Fig. 8.

Fig. 10 is a plain view of an exemplary case in which a conventional motor supporting device is applied to a pickup driving mechanism.

BEST MODE FOR CARRYING OUT THE INVENTION

Several embodiments for carrying out best the present invention are now explained with reference to attached drawings, in order to explain the present invention to details.

[First Embodiment]

Fig. 1 is a plain view of the motor supporting device according to a first embodiment of the present invention. Fig. 2 is a side view of the motor supporting device. Fig. 3 is a perspective view of a locking piece and a locking claw for use in a cover-fixing operation. Fig. 4 is a perspective view of a locking piece and a locking claw for use in a case-fixing operation. Fig. 5 is a sectional

view corresponding to the sectional surface cut along the line A - A of Fig. 1 in the state that the motor base is in use. Fig. 6 is a front view in the state that the motor base is in use. Fig. 7 is a sectional view corresponding to the sectional surface cut along the line B - B of Fig. 1 in the state that the motor base is in use. Fig. 8 is a plain view of an exemplary case in which the motor base is applied to a pickup driving mechanism, and Fig. 9 is an illustration showing the back surface of the case of Fig. 8.

In these figures, reference numeral 1 denotes a base, 2 denotes a spindle motor for rotating an optical disk, 3 denotes a pickup, 4 denotes a pickup driving mechanism for positioning the pickup 3, and is driven by a driving force transmitted from a gear 8 later-explained. Further, reference numeral 5 denotes a sled motor (motor) that functions as a driving source of the pickup driving mechanism 4, whose drive shaft is provided with a gear 6 through which the drive shaft is threaded by a pressing force.

Reference numeral 7 denotes a motor base (motor supporting device) for sustaining the sled motor 5, which is composed of a motor accommodating section 8 for holding the sled motor 5 therein, a gear holding section 9 provided in a protruded manner from the motor accommodating section 8 for rotatably holding the later-explained gears 13 and 14, and a covering section 10 provided to the motor accommodating section 8, which covers the gear holding section 9 in the form of a flat plane, and applies a side pressure to the gear 6. This motor base 7 is made of, for example, a resin such as polyacetar or the like and can be manufactured as a resin-mold product.

Reference numerals 11 and 12 are support shafts horizontally protruding from the motor accommodating section 8, and are provided

respectively with the gears 13 and 14 through which they thread to rotatably hold them. These gears 13 and 14 transmit the driving force of the gear 6 to the gear 15, and the gear 15 further transmits the driving force to the pickup driving mechanism 4.

5 Reference numeral 16 denotes a bending section provided in a thin plate form at the root portion of the covering section 10, which makes the covering section 10 bendable with respect to the motor accommodating section 8.

Reference numeral 17 denotes a side pressing section
10 protrudedly provided so as to abut with the end portion of the gear 6, and reduces the vibration of the gear 6 by applying a predetermined pressure to the end portion thereof, and numeral 18 denotes a bearing section (fitting portion) formed as a recess for fitting the support shaft 11 therein, and reduces the noise produced by the gear 13 by
15 lowering the vibration of the support shaft 11.

Reference numeral 19 denotes a locking piece (fitting portion) protruding from the covering section 10 for use in a cover-fixing operation, and the end portion thereof is formed with a locking claw (fitting portion) 19a. This cover-fixing locking piece 19 securely
20 fixes the covering section 10 to the motor accommodating section 8, by engaging the locking claw 19a with a locking groove 20 when bending the covering section 10.

Each reference numeral 21 denotes a locking claw for locking the sled motor 5, each numeral 22 denotes a locking piece for use
25 in a case-fixing operation, which protrudes from the motor accommodating section 8, and is formed with a locking claw 22a at its end portion. This case-fixing locking piece 22 securely fixes the motor base 7 to the base 1 by engaging the locking claw 22a with a fitting hole formed in the base 1. Reference numeral 23 denotes

a circuit board.

The operation of the motor supporting device according to the first embodiment of the present invention is as follows.

As shown in Figs. 6 to 8, when the sled motor 5 is activated,
5 the driving force thereof is transmitted to the pickup driving mechanism 6 by way of the gears 13, 14 and 15 in a sequential manner, so that the pickup 3 is activated.

On this occasion, since a predetermined pressure is applied to the end portion of the gear 6 by the side pressing section 17, as
10 shown in Fig. 5, the vibration of the gear 6 can be lowered, and the generation of the noise can thereby be reduced.

Further, as shown in Fig. 7, although the gear 13 is rotated with respect to the support shaft 11, as the end portion of the support shaft 11 is engaged with the bearing section 18 of the covering section
15 10, the vibration of the support shaft 11 can be reduced, and the generation of the noise can thereby be lowered.

It should be noted that by assembling the sled motor 5 and the gears 6 and 13 to the motor base 7, engaging the cover-fixing locking piece 19 with the locking groove 20 and by closing the covering section
20 10, the support shaft 11 is locked with the bearing section 18, so that the gear 13 can be prevented from falling down from the support shaft 11, and the assembling efficiency can thereby be improved.

As explained heretofore, according to the first embodiment of the present invention, due to the fact that the covering section 10
25 is bendably and integrally formed with the motor accommodating section 8, the state in which the covering section 10 is closed can be readily maintained, and also due to the fact that the covering section 10 is formed with the side pressing section 17 and the bearing section 18, the noise caused by the gears 6 and 13 can be greatly

section 18, the noise caused by the gears 6 and 13 can be greatly reduced, yet without increasing the number of components.

It should be noted that the first embodiment of the present invention has been explained as to the case that the present invention
5 is applied to a pickup driving mechanism of a disk device. However, the application of the present invention is not limited to this, but it can also be applied to various small electronic devices, each comprising a motor and a driving gear, and requiring the suppression of noise generated by the gear, and even in this case the same effects
10 can be obtained.

Industrial Applicability

As explained heretofore, the motor supporting device related to this invention is suitable to various small electronic devices,
15 each comprising a motor and a driving gear, and requiring the suppression of noise generated by the gear.

What is claimed is;

1. A motor supporting device comprising:

a motor accommodating section for accommodating and holding a motor therein, and

5 a gear holding section that rotatably holds a gear for externally transmitting a driving force of said motor,

wherein said motor supporting device further comprises a covering section, which is integrally formed with said motor accommodating section and flatly covers said gear holding section.

10

2. A motor supporting device according to claim 1, wherein said covering section is bendably formed with respect to said motor accommodating section, and comprises a side pressing section that abuts to the end portion of said gear provided to the motor drive
15 shaft.

3. A motor supporting device according to claim 1 further comprising a fitting section for fixing said covering section to said motor accommodating section, with said side-pressing section being
20 abutted to the end portion of said gear mounted to said motor drive shaft, said fitting section being provided to at least either one of said covering section and said motor accommodating section.

4. A motor supporting device according to claim 1 further
25 comprising a fitting section for coupling the end portion of a support shaft that is formed in said gear holding section for rotatably holding the gear to said covering section, said fitting section being provided to at least either one of said covering section and the end portion of said support shaft.

ABSTRACT

The motor supporting device is constructed such that the covering section 10 for flatly covering the gear holding section 9 is integrally formed with the motor accommodating section 8 in a freely bendable manner, so that the state in which the covering section 10 is closed can be readily maintained. In addition, since the side-pressing section 17 and the bearing section 18 are covered by the covering section 10, the noise generated by the gears 6 and 13 can be drastically suppressed with a relatively simple construction, yet without increasing the number of components.

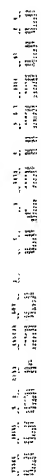


FIG.2

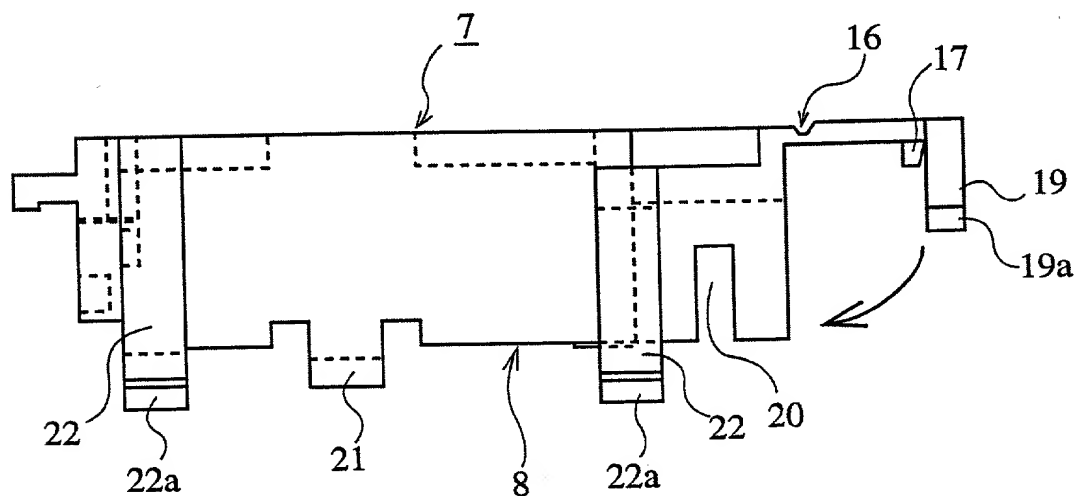


FIG.3

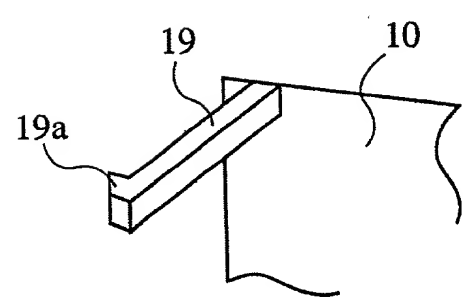


FIG.4

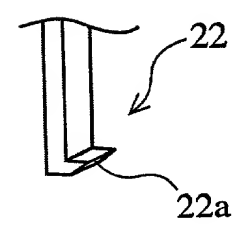


FIG.5

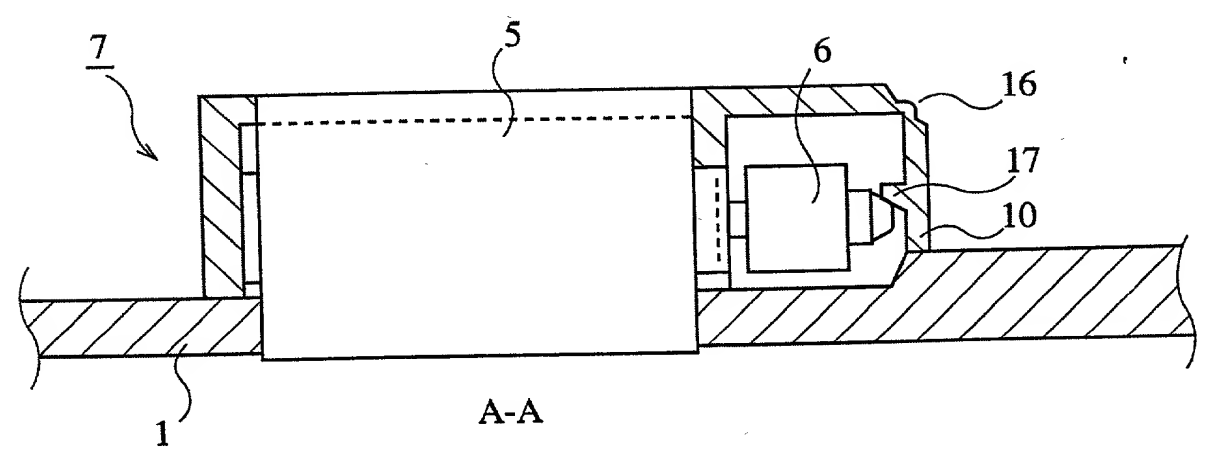


FIG.6

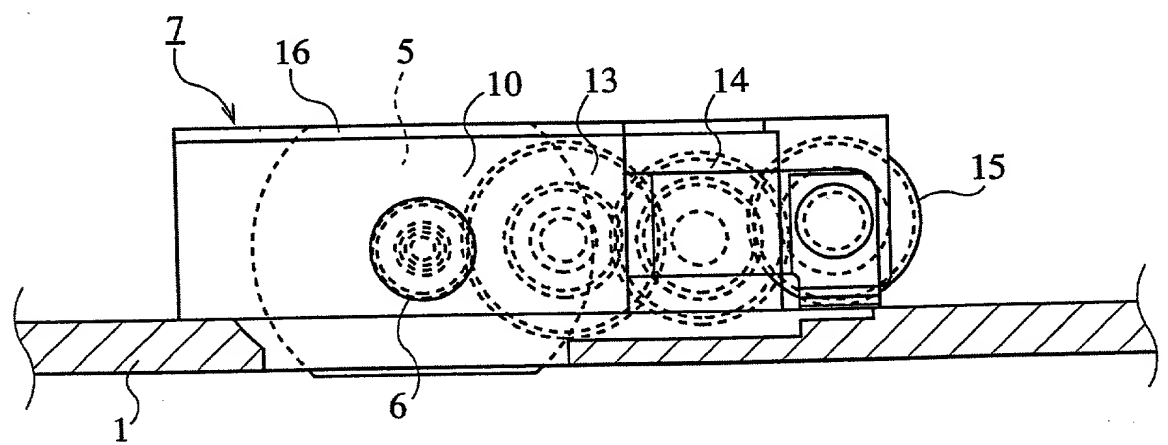


FIG. 7

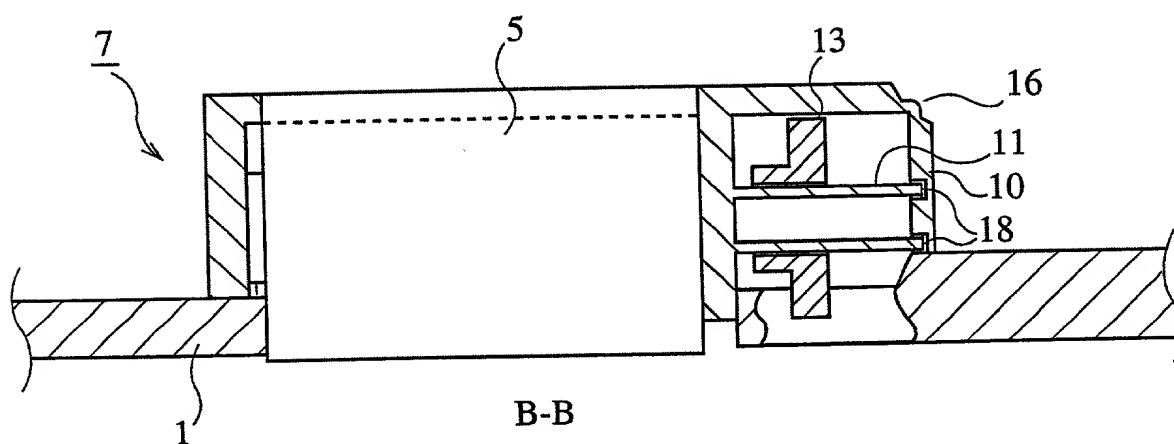


FIG. 10

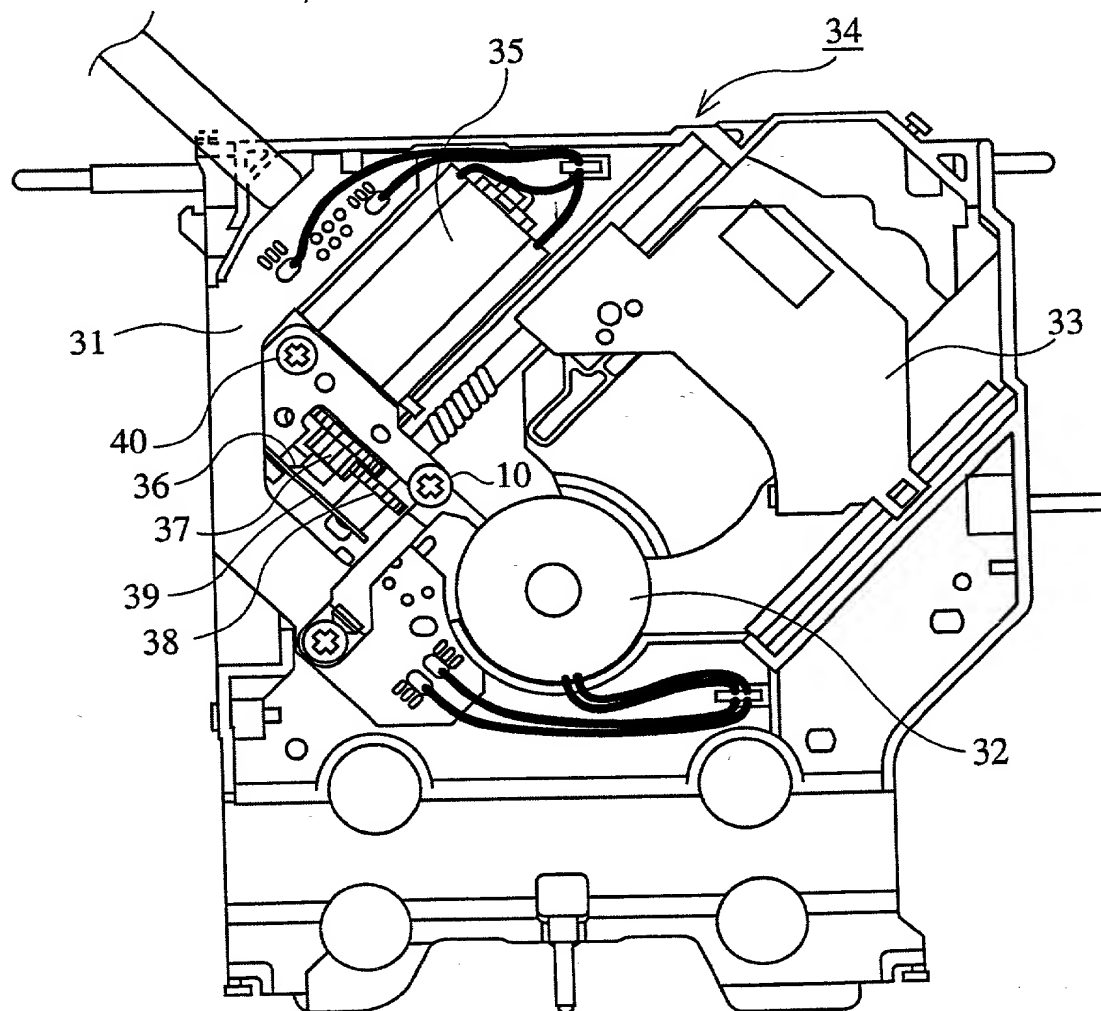


FIG.8

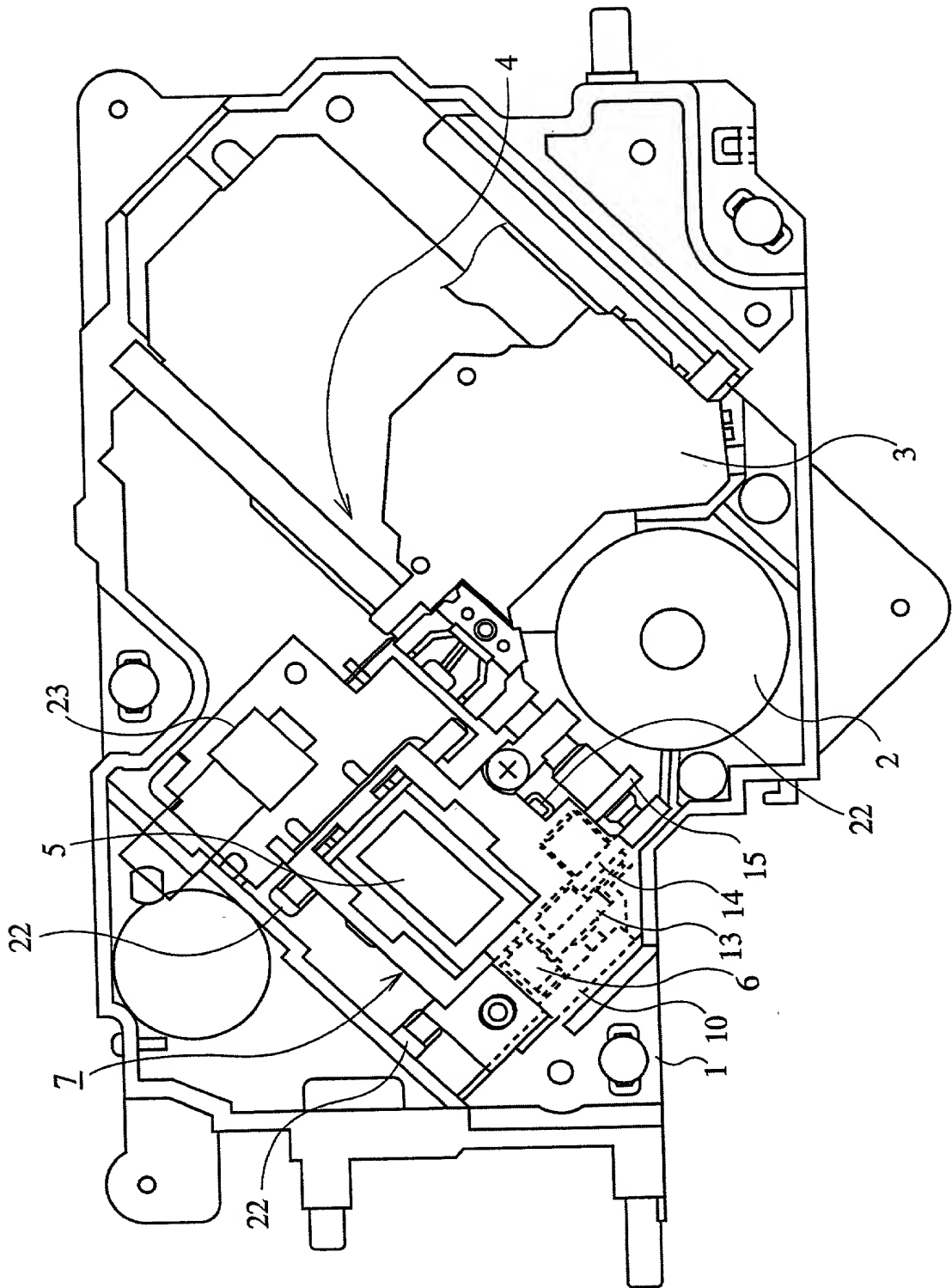
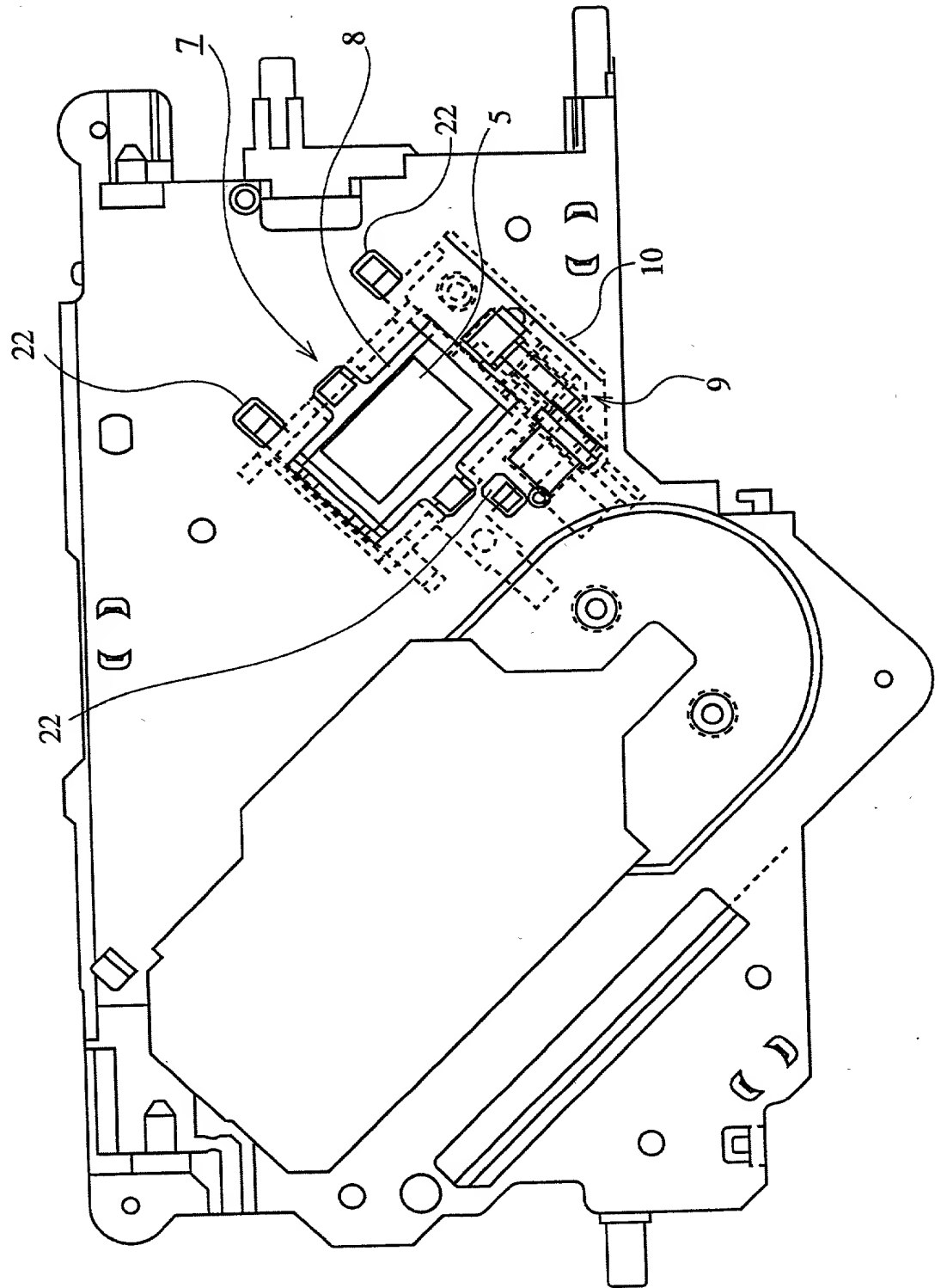


FIG.9



Declaration and Power of Attorney for Patent Application

特許出願宣言書

Japanese Language Declaration

私は、下欄に氏名を記載した発明として、以下の通り宣言する：

As a below named inventor, I hereby declare that: 1

私の住所、郵便の宛先および国籍は、下欄に氏名に続いて記載したとおりであり、

My residence, post office address and citizenship are as stated below next to my name,

名称の発明に関し、請求の範囲に記載した特許を求める主題の本来の、最初にして唯一の発明者である（一人の氏名のみが下欄に記載されている場合）か、もしくは本来の、最初にして共同の発明者である（複数の氏名が下欄に記載されている場合）と信じ、

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

"MOTOR SUPPORTING DEVICE"

その明細書を
(該当するほうに印を付す)

the specification of which
(check one)

☐ ここに添付する。

☐ is attached hereto.

☐ _____ 日に出願番号

☒ was filed on September 29, 1998 as

第 _____ 号として提出し、

Application Serial No. PCT/JP98/04385

_____ 日に補正した。
(該当する場合)

and was amended on _____
(if applicable)

私は、前記のとおり補正した請求の範囲を含む前記明細書の内容を検討し、理解したことを陳述する。

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37部第1章第56条(a)項に従い、本願の審査に所要の情報を開示すべき義務を有することを認める。

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Japanese Language Declaration

私は、合衆国法典第35部第119条、第172条、又は第365条に基づく下記の外国特許出願又は発明者証出願の外国優先権利益を主張し、さらに優先権の主張に係わる基礎出願の出願日前の出願日を有する外国特許出願又は発明者証出願を以下に明記する：

Prior foreign applications 先の外国出願

(Number)
(番号)

(Country)
(国名)

(Day/Month/Year Filed)
(出願の年月日)

(Number)
(番号)

(Country)
(国名)

(Day/Month/Year Filed)
(出願の年月日)

(Number)
(番号)

(Country)
(国名)

(Day/Month/Year Filed)
(出願の年月日)

(Number)
(番号)

(Country)
(国名)

(Day/Month/Year Filed)
(出願の年月日)

(Number)
(番号)

(Country)
(国名)

(Day/Month/Year Filed)
(出願の年月日)

Priority claimed 優先権の主張

☐

Yes
あり

☐

No
なし

☐

Yes
あり

☐

No
なし

☐

Yes
あり

☐

No
なし

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Yes
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No
なし

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Yes
あり

☐

No
なし

私は、合衆国法典第35部第120条に基づく下記の合衆国特許出願の利益を主張し、本願の請求の範囲各項に記載の主題が合衆国法典第35部第112条第1項に規定の態様で先の合衆国出願に開示されていない限度において、先の出願の出願日と本願の国内出願日又はPCT国際出願日の間に公表された連邦規則法典第37部第1章第56条(a)項に記載の所要の情報を開示すべき義務を有することを認める。

I hereby claim the benefit of Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose any material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)
(出願番号)

(Filing Date)
(出願日)

(現況)
特許済み、係属中、放棄済み

(Status)
(patented, pending abandoned)

(Application Serial No.)
(出願番号)

(Filing Date)
(出願日)

(現況)
特許済み、係属中、放棄済み

(Status)
(patented, pending abandoned)

私は、ここに自己の知識に基づいて行った陳述がすべて真実であり、自己の有する情報及び信ずるところに従って行った陳述が真実であると信じ、更に故意に虚偽の陳述等を行った場合、合衆国法典第18部第1001条により、罰金もしくは禁固に処せられるか、又はこれらの刑が併科され、又はかかる故意による虚偽の陳述が本願ないし本願に対して付与される特許の有効性を損なうことがあることを認識して、以上の陳述を行ったことを宣言する。

I hereby declare that all statements made herein of my own knowledge are true; and further that all statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Japanese Language Declaration

委任状 私は、下記発明者として以下の代理人をここに
選任し、本願の手続きを遂行すること並びにこれに関する一
切の行為を特許商標局に対して行うことを委任する。
(代理人氏名及び登録番号を明記のこと)

POWER OF ATTORNEY As a named inventor, I hereby
appoint the following attorney(s) and/or agent(s) to
prosecute this application and transact all business in the
Patent and Trademark Office connected therewith (list
name and registration number)

I hereby appoint John H. Mion, Reg. No. 18,879; Donald E. Zinn, Reg. No. 19,046; Thomas J. Macpeak, Reg. No. 19,292;
Robert J. Seas, Jr., Reg. No. 21,092; Darryl Mexic, Reg. No. 23,063; Robert V. Sloan, Reg. No. 22,775; Peter D. Olexy, Reg.
No. 24,513; J. Frank Osha, Reg. No. 24,625; Waddell A. Biggart, Reg. No. 24,861; Robert G. McMorrow, Reg. No. 19,093;
Louis Gubinsky, Reg. No. 24,835; Neil B. Siegel, Reg. No. 25,200; David J. Cushing, Reg. No. 28,703; John R. Inge, Reg. No.
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Howard L. Bernstein, Reg. No. 25,665; Alan J. Kasper, Reg. No. 25,426; Kenneth J. Burchfiel, Reg. No. 31,333; Gordon Kit,
Reg. No. 30,764; Susan J. Mack, Reg. No. 30,951; Frank L. Bernstein, Reg. No. 31,484; Mark Boland, Reg. No. 32,197; William
H. Mandir, Reg. No. 32,156; Scott M. Daniels, Reg. No. 32,562; Brian W. Hannan, Reg. No. 32,778; Abraham J. Rosner, Reg.
No. 33,276; Bruce E. Kramer, Reg. No. 33,725; Paul F. Neils, Reg. No. 33,102; and Brett S. Sylvester, Reg. No. 32,765, my
attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and
request that all correspondence about the application be addressed to SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC, 2100
Pennsylvania Avenue, N.W., Washington, D.C. 20037-3202.

書類の送付先:

Send Correspondence to:

SUGHRUE, MION, ZINN, MACPEAK & SEAS
2100 Pennsylvania Avenue, N.W., Washington, D.C. 20037

直通電話連絡先: (名称及び電話番号)

Direct Telephone Calls to: (name and telephone number)

(202)293-7060

唯一の又は第一の発明者の氏名	100	Full name of sole or first inventor	Shigeki ASAI
同発明者の署名	日付	Inventor's signature	Shigeki Asai May 2, 2000
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国籍		Citizenship	Japanese
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第二の共同発明者の氏名 (該当する場合)		Full name of second joint inventor, if any	
同第二発明者の署名	日付	Second inventor's signature	Date
住所		Residence	
国籍		Citizenship	
郵便の宛先		Post office address	

(第三又はそれ以降の共同発明者に対しても同様な情報
および署名を提供すること。)

(Supply similar information and signature for third and
subsequent joint inventors.)